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Cotton and Manpower

Texas High Plains

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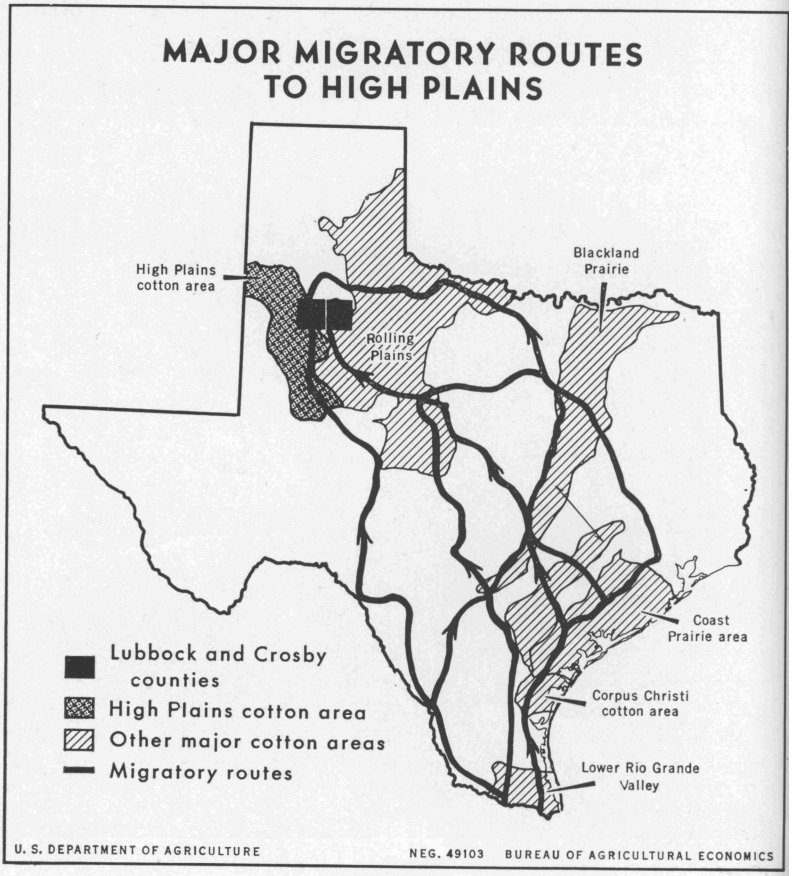
MAJOR MIGRATORY ROUTES
TO HIGH PLAINS
High Plains
cotton area
Rolling
Plains
Blackland
Prairie
Coast
Prairie area
Corpus Christi
cotton area
Lower Rio Grande
Valley
Lubbock and Crosby
counties
High Plains cotton area
Other major cotton areas
Migratory routes
U. S. DEPARTMENT OF AGRICULTURE
NEG. 49103 BUREAU OF AGRICULTURAL ECONOMICS

Figure 1.

DIGEST

This report presents the results of a study of farm labor employed in the cotton crop of the Texas High Plains. Made in Lubbock and Crosby counties by the Texas Agricultural *Experiment Station and the Bureau of Agricultural Economics* of the United States Department of Agriculture, the study covered the experience of 324 farm operators in the 1951 crop. It was focused on the types, sources and utilization of labor in an area that annually requires large inputs of manpower in the hoeing and chopping and harvest operations.

An area of commercial, family-type farms, the High Plains long has been the terminal point for a large stream of migratory farm workers originating mainly in South Texas. Labor-saving machinery, including mechanical cotton harvesters, are in wide use and make the High Plains an excellent laboratory for analyzing the probable effects of high-level mechanization in the rest of the Cotton South. The findings point up the role of regular hired workers and of the operator and his family in mechanized cotton production. They also show the need for worker training programs, more adequate educational facilities for the children of migratory workers, and a better understanding of the functions of public employment services.

One of the principal results of the study is the attention it directs to an institutional barrier to full mechanization of cotton crop. The barrier is an outgrowth of a tenure system that has not kept pace with farm technology. As a consequence, full owners in 1951 machine harvested between 2 and 3 times as large a proportion of their cotton as did tenants. If more productive use of available cotton manpower is to be achieved, it is evident that research and education in the field of landlord-tenant relations must move along with, or precede, the advance of technical developments.

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COTTON AND MANPOWER-Texas High Plains

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MANPOWER IS A KEY FACTOR in the national defense program. Conditions relating to the supply and utilization of manpower on farms are important from the standpoint of essential agricultural production. Similarly, as workers may move freely between farm and nonfarm employment, these conditions are highly relevant to the production of defense goods in industry.

Expansion of the Nation's preparedness effort necessarily places a strain on the labor market. Within agriculture, the effects vary in different parts of the country, and with different crops. Of all the crops, however, cotton regularly involves the highest man-labor requirements in the full harvest. As the largest cotton-producing state, Texas has a major stake in the solution of farm manpower problems. This is especially true during a national emergency.

Previous studies of farm labor supply and utilization in Texas have been restricted largely to the collection of statistics to meet certain specialized administrative needs in connection with public programs. Farm management studies of labor requirements have been made for a number of areas, but, without the complementary studies of supply and utilization, this information is not adequate as a manpower policy guide. Previous studies particularly have neglected the utilization of seasonal farm labor.

PURPOSES OF THE STUDY

The study on which this report is based represents an attempt to appraise the farm manpower experience of one cotton-producing area of Texas during the 1951 season. Questions for which answers were sought dealt with the extent of use of various types of labor by source, including the on-farm labor supply; the existence of labor reserves; effects of the Korean outbreak on normal labor sources; organized means of retaining or increasing the labor supply; and the outlook for the 1952 harvest.

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The study was designed to furnish practical information to farm employers and workers on the High Plains and to local, state and national agencies having operating responsibilities in the field of farm manpower and wages. Four preliminary reports on selected phases of the study have been released as Progress Reports 1491, 1501, 1502 and 1506 by the Texas Agricultural Experiment Station.

AREA OF STUDY

The High Plains cotton area was studied because it is a labor-deficit area during the cotton harvest. In an average season, the High Plains must depend for harvest labor on the timely appearance of thousands of migratory workers from South Texas and elsewhere. At the same time, the area has a peculiar advantage in machine substitution for hand labor. It appears to be moving rapidly toward maximum use of mechanical harvesting equipment. Cotton plantings were heavy on the High Plains in 1951. Despite some disappointments owing mainly to unfavorable weather, about one million bales of cotton were produced on less than three million acres of land.

Thus, the area offered an excellent setting for a study of farm man power. Within the area, Lubbock and Crosby counties were chosen for sampling. These counties together typify the High Plains. In 1951, their record of production was consistent enough to provide a reliable pattern of experience. Immediately after the 1951 cotton harvest, 324 farmers in the two counties were interviewed. This was, however, about 3 months after the portion of the harvest involving hand labor was completed. Sample farms may be considered representative of all cotton farms in Lubbock and Crosby counties in 1951. See "Methodology of the Survey."

The important position of the High Plains in cotton production results from a combination of physical conditions. Fine sandy loams comprise the dominant soils. Its smooth topography slopes to the south and east at about 7 feet a mile. Its elevation ranges from 3,700 feet in the northwest to 2,500 feet in the southeast. With a growing season of approximately 210 days and rainfall averaging 20 inches, cotton may be produced on dry land at a minimum cost for the control of weeds, insects and plant diseases. But it was the expansion of irrigation that raised and stabilized its yields.

Cotton acreage on the High Plains varies from year to year, depending on fluctuations in price, weather conditions

and programs of acreage restriction. Grain sorghum is the main competing crop. In 1950, cotton occupied about 40 percent and grain sorghums approximately 50 percent of the cropland. Wheat, the third most important crop, accounted for most of the remainder. Oats, barley, hay and a few vegetable crops were grown on small acreage.

Irrigation

Since 1940, when only 250,000 acres were being irrigated on the High Plains, a striking increase in irrigation farming has occurred. In 1950, an estimated 14,000 wells were supplying irrigation water for nearly 2,000,000 acres. But these gains were made at considerable cost. In addition to the expense of drilling wells and installing pumping equipment, irrigated cotton production introduced problems of weed and insect control and a higher year-round labor bill.

Irrigation has not greatly affected the significant natural advantages of the High Plains. Level topography still permits the universal application of multi-row—mainly four-row —tractor-drawn equipment and the tilling of relatively large acreages per operator. The average date of the first killing frost, November 4, assures comparatively early defoliation of the cotton plants, and makes widespread use of mechanical harvesting equipment possible.

Mechanization

In making decisions concerning the use of a mechanical harvester, farmers on the High Plains must take into account a number of factors. For example, they must decide whether to plant one of the storm-resistant varieties of cotton to minimize weather damage and field losses incurred while awaiting the defoliation which follows the first frost. They must make a decision either to buy a cotton-stripping machine or to depend on the availability of custom strippers. The optimum acreage for a stripper, estimated at 275 acres of dryland cotton or 200 acres of irrigated cotton, must be considered. Grade and field losses which accompany stripper use must be weighed against probable savings in wages paid for hand harvesting. As wages are largely determined by the volume of migratory workers and anticipated prices for cotton, farmers must appraise in advance the prospective labor supply. Yields are important also, as it is difficult to attract crews of workers to harvest a poor stand of cotton. Even the condition of the crop in areas of Texas south of the High Plains

figure in calculations, as these areas compete for harvest labor.

Farm Size and Tenure

The alternative use of machinery or human labor, therefore, becomes a complex problem of economic judgment. Only a few factors, such as size of farm, amount of irrigated land and the tenure of the operator can be known in advance. (See Tables 1 and 2.)

Table 1 shows the proportion of irrigated cotton on the 324 sample farms, distributed by the total cotton acreage on these farms. Part or all of the cotton land was irrigated on 70 percent of the cotton-producing farms in the two counties. On 60 percent of the cotton farms, more than half of the crop was grown under irrigation. The entire crop was irrigated on 23 percent of these farms. The remainder, comprising 30 percent of the total, produced cotton entirely on dry land.

Dry-land farming was associated with the larger units, which had 250 acres or more planted to cotton. Nearly 40 percent of the farms in this size group, mainly in Crosby county, had no irrigation facilities. Small farms, those having less than 125 acres in cotton, appeared most frequently in the "50 percent and over" irrigation category. All cotton land was irrigated on only 13 percent of the small farms. Irrigation was practiced in varying degrees on a higher proportion of medium-size farms, with 125-249 acres in cotton, than on either of the other two farm-size groups.

The tenure status of an operator often affects labor utilization. It determines the incidence of labor costs or, if machinery is substituted, of labor savings. (See "Economics of Mechanical Harvesting in the High Plains Cotton Area of Texas," Texas Station Bulletin 735.) The extent to which this difference in income might slow down mechanization of the harvest is uncertain. It is clear, however, that a high rate of

Table 1. Extent of cotton acreage irrigated, by total acres in cotton on 324 farms, Lubbock and Crosby counties, 1951

Acres in cotton	All farms		Farms with a given percentage of cotton acreage irrigated							
			None		Up to 50 percent		50-99 percent		100 percent	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All farms	324	100	96	30	33	10	119	37	76	23
Under 125	88	100	24	27	4	4	49	56	11	13
125 -249	126	100	30	24	10	8	48	38	38	30
250 and over	110	100	42	38	19	17	22	20	27	25

tenancy is a factor of some importance in the mechanization picture, and that tenancy rates are relatively high in each of the counties on the High Plains. According to the 1950 Census of Agriculture, 49 percent of the farms in Lubbock county and 41 percent of those in Crosby county were operated by tenants.

Similar results were obtained in 1952. In the two counties combined, 43 percent of the farms were operated by share tenants, 30 percent by full owners and 24 percent by part owners (Table 2). A scattering of partnerships, operating sharecroppers and others accounted for the rest of the tenure arrangements.

Full owners tended to be concentrated in the small-farm group having less than 125 acres in cotton. Part ownership occurred most frequently on the large farms having 250 acres or more in cotton. Share tenants were identified to a considerable degree with medium-size farms. More specifically, 43 percent of the small farms were operated by full owners, 52 percent of the medium-size farms by share tenants and 36 percent of the large farms by part owners.

These variations in tenure by size of farm were closely related to the different levels of investment in farm real estate and machinery. Full owners were the oldest of the tenure groups and were less likely to be interested in operating a large acreage. By investing their funds in equipment, share tenants could operate larger farms than would otherwise be possible. Part ownership, on the other hand, was frequently employed by owners as a method for expanding their scale of operations to maximize the use of large machinery. These choices of tenure permit adjustments that are highly desirable in a dynamic agriculture. As already indicated, however, they impinge on the progress of mechanization and, hence, on decisions as to the use of labor.

Table 2. **Tenure of operators on 324 farms, by total acres in cotton, Lubbock and Crosby counties, 1951**

Acres in cotton	All farms		Farms operated by							
			Full owners		Part owners		Share tenants		Others[1]	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All farms	324	100	97	30	78	24	140	43	9	3
Under 125	88	100	38	43	11	13	36	41	3	3
125 - 249	126	100	30	24	28	22	66	52	2	2
250 and over	110	100	29	26	39	36	38	34	4	4

[1]Includes partnerships, estates and operating half-and-half sharecroppers.

Figure 2. Harvest workers snapping cotton on the High Plains. Note the unopened bolls. Fields are generally large and require the services of crews of workers, many of whom migrate from South Texas.

FARM MANPOWER ON THE HIGH PLAINS

Cotton farming on the High Plains developed on a manpower-scarce basis. In few, if any, years has the local supply of labor been sufficent to meet peak seasonal demands. As rapidly as the grazing economy gave way to the cultivation of cotton and other row crops, recruitment of additional workers from outside the area became an annual problem for farmers and employment agencies.

During periods of general labor scarcity, the problem becomes more serious. One year during World War II, farm labor requirements on the High Plains in the peak month of November called for 2-½ times the regular force then available on farms. The fullest practicable use of all workers in the area would have supplied less than half the workers needed in 1943.

To cope with such stringencies, the farmers have available two courses of action to reduce reliance on migratory workers: They can resort to mechanical cotton harvesters or shift the cropping system toward a low labor-consuming crop like grain sorghum. At various times, they have done both.

As far back as 1914, home-made wooden sleds were widely used to harvest cotton on the High Plains. Ground losses resulting from the use of this crude instrument were heavy, however, and could be justified only when cotton prices were low in relation to wage rates. Nearly a third of the crop was sledded in 1926, as compared with only a small percent between 1929 and 1935. Improved mechanical strippers began appearing in the 1940's, and by 1944 these machines were used to harvest about 20 percent of the crop.

The development of combine-type grain sorghums provided High Plains farmers a cash crop alternative to which they can readily turn when labor is scarce and when relative prices favor the shift. Acreage adjustments during the war years illustrate this point. In 1941, cotton and grain sorghum acreages were about equal on the High Plains. Slightly more than a million acres were in each crop. By 1945, grain sorghum was planted on nearly three million acres, and cotton plantings had declined to about 400,000 acres. As cotton prices rose after the war, a reverse trend occurred, until by 1951 cotton plantings approached the three million-acre mark as grain sorghum steadily declined. This expansion of the big labor-consuming crop did not signify a corresponding increase in the labor supply. Rather, it was accompanied by increasing

dependence on machine harvesting as a means of reducing the risk of labor shortages and high labor costs.

Competition with Other Areas

Despite the increased use of machine harvesters, most farmers on the High Plains still prefer to "snap" their cotton by hand the first time over. Thus, the demand for harvest labor remains heavy, especially through October and early November. No complete count of the number of workers who migrate into the High Plains area has ever been made, although estimates of the Texas Farm Placement Department range from 100,000 to 150,000 in the average year. Volume and timing of migration depend on a variety of factors, the most important being the demand situation in cotton-producing areas lying south and east of the High Plains. Most of the harvest workers travel in crews of 10 to 20 persons. The large, high-yielding fields on the High Plains have long been the chief objective of their trek.

There are other attractions as well. Wage rates on the High Plains are generally above those paid in other parts of the State, a condition made possible by production efficiency and made necessary by the area's remoteness from the centers of labor supply. Apart from the relatively attractive wages, the High Plains also enjoy a reputation for good labor relations. In recent years, housing for seasonal workers has improved and the number of units has greatly increased. Other facilities, including recreation, have been provided in the towns and cities. A gradual settling of migrants (an estimated 10,000 Latin-Americans in the city of Lubbock alone) has speeded the process of accommodation and brought the familiar language, foods and customs into the environment to stay. Schooling for the children of migratory workers and unsatisfactory health conditions continue to be unsolved problems, but these are scarcely worse on the High Plains than at the places of origin of the worker families.

Recruitment Methods

The public agency which is responsible for the orderly routing and placement of migrants on the High Plains is the Farm Placement Department (generally called by farmers the "Farm Labor Office") of the Texas Employment Commission. Operating from directional stations located at such points as Brady and Abilene, the Farm Placement Department directs as many as 50 crews a day to the areas of greatest demand.

Within the area, a labor camp provided jointly by the city and county of Lubbock served as a placement and distribution center.

Many cotton farmers deal directly with crew leaders and workers, frequently establishing a working agreement that extends from year to year. Before the cotton-harvesting season opens, farmers maintain contacts by correspondence, by telephone and, in some instances, by personal visits to South Texas. An estimated 5,000 to 6,000 harvest workers now live year-round in Lubbock, yet there is little "day haul" activity. These local workers usually form crews and negotiate with farmers through leaders who, as with the migrants, provide transportation for the workers to the fields and for the cotton to the gins.

A 5-day week is standard for cotton pullers, Saturday and Sunday being days of rest and recreation. Individual performance rates vary considerably, but some proficient workers can pull as much as 800 pounds of cotton daily. The average would be closer to 400 pounds, or slightly more than one bale a week per worker.

THE 1951 SEASON

Manpower supply and utilization in the 1951 cotton crop of the High Plains were marked by unusual circumstances. In the first place, under the pressure of rising cotton prices and encouragement from governmental sources, Texas farmers increased their cotton acreage from 7,048,000 in 1950 to 12,407,000 in 1951. Outside of the High Plains, most of the increased acreage was located along the routes normally followed by migratory harvest workers — beginning in the Lower Rio Grande Valley, then northward through the Corpus Christi cotton area, the Coast Prairie, the Blackland Prairie and the Rolling Plains. (See Figure 1.) Initially, crop prospects were generally excellent.

Weather soon became the key factor in the outlook for labor supply and wage rates. Abnormal planting seasons narrowed the usual spread in maturity dates from the southern producing areas to the High Plains, and it appeared that competition for available labor would become intense by early fall.

Farmers on the High Plains became apprehensive because the region is the terminal area in the migration, and farmers on the Blackland Prairie were worried because of their relatively weaker competitive position in a short harvest season. Fears of a ruinous labor shortage were voiced by farmers, by

agricultural agencies and by the daily press. A continued draining of farm workers into industrial jobs and into the armed forces added to the concern. Organized efforts to obtain the services of Mexican Nationals for the harvest were started in many parts of the State.

Drouth

Weather conditions allayed the threat of a labor shortage as the 1951 season progressed. A moisture deficiency had seriously reduced crop prospects by the end of July. Weather reports continued adverse through August. Temperatures above 110 degrees were reported from numerous stations. Cotton began opening prematurely as far north at the Red River and west of the Rolling Plains. Yields from the early crop in the Lower Rio Grande Valley reached and exceeded expectations. Otherwise, except for the High Plains, there was disappointment.

But over most of Texas the rains came too late. In early September, the Bureau of Agricultural Economics reported that "benefits to late cotton in northern counties of the Blackland and Low Rolling Plains areas failed to materialize as the return of scorching temperatures depleted moisture received during the previous week and caused further deterioration." Throughout the summer, the High Plains was referred to as the "favored" area. In one of the most abnormal seasons in history, cotton farmers in the Lower Rio Grande Valley were racing to complete their harvest before September 15, when stalks must be destroyed as a safeguard against the pink bollworm, while the first bales were being harvested near Lubbock.

Between the two geographic extremes, the cotton crop fell far short of early indications. Migratory workers moved past scorched fields in the Blacklands and converged on the High Plains earlier than usual. On October 8, the *Lubbock Avalanche-Journal* reported that 20,000 cotton pullers, including 15,000 migrants, were at work in the county. A demand for an additional 4,500 workers was indicated, although this was not regarded as a shortage. Schools were closed at Littlefield, Brownfield and Morton.

A killing frost on October 31 caused the cotton leaves to fall within 10 to 14 days and permitted the large-scale use of machine strippers. For the remainder of the season, overcrowded gin facilities were the principal bottleneck to completion of the cotton operation. A bumper crop was harvested without serious mishap.

Employment of Mexican Nationals

By far the greatest proportion of workers in the cotton harvest of the High Plains, as usual, consisted of American citizens of Mexican extraction who migrated northward from the southernmost counties of Texas. A comparatively small number of Mexican Nationals, however, were employed during 1951 in Lubbock and Crosby counties. Approximately 1,200 of these farm laborers from Mexico worked in the area during all or part of the cotton season.

The School Law

The family relationship occupies a place of extraordinary esteem in the value system of the typical migratory worker. Wife, children and aged members of the kinship group commonly accompany the family head on his travels, despite the inevitable discomforts and despite living conditions which are often poor. Except for the very young or infirm members, the entire family usually works in the cotton fields.

An amendment to the child-labor provisions of the Federal Fair Labor Standards Act in 1949 altered this family work pattern in the cotton harvest of the High Plains. The amendment, which became effective in 1950, applies to all farm employers whose crops or products go either directly or indirectly into interstate or foriegn commerce. It makes

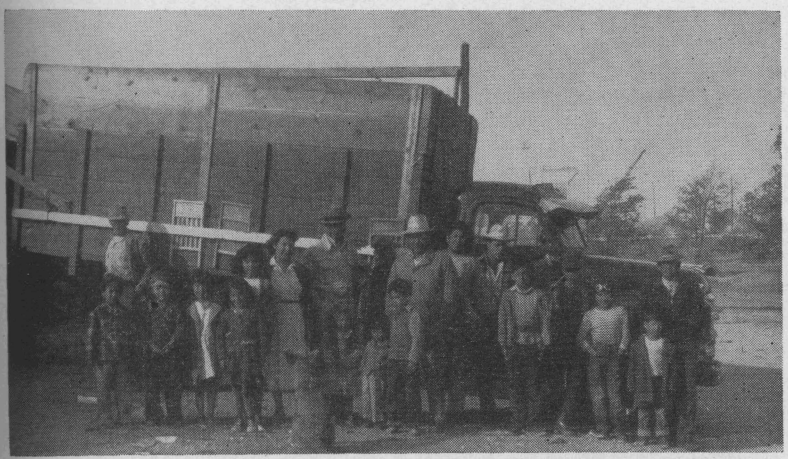

Figure 3. A group of migratory cotton-harvest workers on the Texas High Plains. Adult workers predominate in the harvest, but many Latin-American families bring children and older members along.

illegal the employment of children under 16 years of age during school hours, other than the farmer's children on his own farm, and provides heavy penalties for wilful violation by the employer.

The amended law undoubtedly reduces the effective labor supply as represented by any given number of migrant families, although the extent of this reduction can scarcely be gauged in a season such as 1951 when the supply of adult workers was generally adequate. Its impact—real or anticipated—may have strengthened the trend toward a mechanized harvest. It unquestionably stimulated intra-area migration, causing many families to move from one school district to another to enable their children to work in a district which had closed its schools temporarily. It evoked criticism from many farmers who maintained that most of the older children would not attend school anyway. They said farmers were simply deprived of part of their labor force and the worker

Figure 4. Weighing in cotton at the turning row. Members of the operator's family on the High Plains seldom pull cotton themselves, but keep busy during the harvest with weighing, checking, hauling and other management duties.

families of part of their income, without really contributing to the educational needs of the migrant children.

School attendance in 1951 was increased tremendously in some localities. Both teaching staffs and facilities were heavily burdened in the early fall. Some rural schools reported increases in enrollment as high as 125 percent. Many of these children could not speak English, and few of the teachers understood Spanish. Before the end of the cotton harvest, approximately half of the schools in Lubbock county closed for the rest of the season. Most schools in the larger population centers remained open, leading to considerable debate among residents of the different districts over school policies.

Past estimates of labor requirements and of labor supply for the High Plains have been based largely on a "head count," with perhaps a crude allowance for variations in the age composition of labor crews. To the extent that children are eliminated from the labor force, this method of calculation is no longer valid. Application of the law further suggests a serious need for providing appropriate school facilities for migrants without disrupting normal periods of attendance by resident children. The implications of this problem are not altogether local in character and its solution does not rest solely with local people.

LABOR-USE PATTERNS

The types of labor used in cotton operations vary widely among production areas in the United States. In some sections, cotton production is largely a matter of family labor; in others, most of the work is done by large crews of hired workers who are recruited to do the chopping and picking. Size of farming operations most often establishes labor-use patterns, though tenure and share-cropping arrangements are also important. Local traditions in regard to the dignity or indignity of different types of farm work have served to complicate the labor-use picture. In recent years, mechanization of cultivation, weed control and harvesting have started to change the patterns of labor use in cotton operations all over the country.

The Texas High Plains is in transition from hand harvesting with large crews of migratory workers to a mechanized harvest operation. It affords an opportunity to observe labor use under both types of harvesting operations, and under a combination of the two methods on the same farm. Labor use in harvesting cotton is related to that in hoeing and

chopping and in other production operations. Hence, it is desirable to analyze the labor-use patterns in all the major cotton operations.

Cultivation

Cultivating operations on the High Plains are usually done by the operator or by some member of his family. Family workers engaged in these operations on 89 percent of the farms in the two sample counties but did only 59 percent of the total job (Table 3), because on farms large enough to afford regular hired workers this work was frequently done by them, or partly by them and by the operator. Operators of small farms estimated that they, or members of their families, did 85 percent of the cultivation work and that regular hired workers did 4 percent. Those on medium-size farms

Table 3. Percentage of major cotton operations performed by family, regular hired, local seasonal, migratory and other types of labor, Lubbock and Crosby counties, 1951

Operation and type of labor used	Percentage of operation performed by each type of labor			
	All farms[1]	Small farms	Medium farms	Large farms
	Percent			
Cultivating	100	100	100	100
Operator and family	59	85	74	49
Regular hired labor	32	4	19	42
Local seasonal	8	9	5	9
Migratory	0	0	1	0
Exchange	1	1	1	0
Custom	0	1	0	0
Hoeing and chopping	100	100	100	100
Operator and family	9	29	15	4
Regular hired labor	11	1	9	13
Local seasonal	39	48	38	38
Migratory	41	22	38	45
Hand pulling	100	100	100	100
Operator and family	2	9	1	1
Regular hired labor	3	2	2	4
Local seasonal	13	25	14	11
Migratory	82	64	83	84
Stripper operation	100	100	100	100
Operator and family	46	50	48	45
Regular hired labor	25	2	12	34
Local seasonal	16	20	22	13
Migratory	2	3	2	1
Exchange	1	6	2	0
Custom	10	19	14	7

[1]Averages weighted by average size of farms in each size group: small, 77.8 acres in cotton; medium, 178.7 acres in cotton; large, 477.6 acres in cotton. Percentages are shown as a total of each operation, exclusive of farms on which the specific operation was not performed. On 1 percent of the sample farms there was no hoeing or chopping, on 9 percent no hand pulling and on 9 percent no machine stripping. Cultivating was done on all farms.

still did 74 percent of this work with family labor, regular workers 19 percent. Operators of farms of more than 250 acres did 49 percent with family labor and 42 percent with regular hired workers.

Chopping and hoeing of cotton, on the other hand, were done largely by local or migratory seasonal workers. Family workers engaged in this operation on 41 percent of the farms but performed only 9 percent of the entire job. On small farms, 29 percent of the hoeing was done by the operators or members of their families, as compared with 15 percent on medium farms and 4 percent on large farms. Eighty percent of this operation was done by seasonal workers, either local or migratory. Small operators used a larger number of local workers. Large operators were more inclined to hire migratory workers. This difference is probably associated with the fact that migratory workers are inclined to travel in fairly large crews, whereas local workers may work as individuals or in family groups.

Harvesting

The type of work force in the harvest varied significantly with the degree to which harvest operations were mechanized. Practically all hand pulling was done by hired labor. Family workers participated in the actual harvest on only 10 percent of the farms and performed only 2 percent of the hand-pulling operations. More than 80 percent of this operation was done by migratory workers and another 15 percent by local seasonal laborers. Local workers were employed to a greater extent on small farms than on the large holdings. Family workers performed an average of 9 percent of the hand pulling on small farms but only 1 percent on large holdings.

On the other hand, family workers, including the operator, provided nearly half of the labor expended on stripper operations and contributed some machine work on about two-thirds of the sample farms. Regular hired workers also played a much more important role in stripping operations than in hand harvesting, performing a fourth of the total of such labor. These workers performed a third of the hand harvesting on large farms. Small and meduim farms, having fewer regular hired workers, depended to a greater extent on local seasonal workers and on custom stripping. Twenty percent of the mechanical harvesting on small farms was done by local seasonal workers and 19 percent on a custom basis, as compared with 22 percent and 14 percent, respectively, on medium farms. Migratory workers were rarely used in stripping operations, regardless of farm size.

Machine Operations

If the pattern of labor use in 1951 is indicative of what may be expected in a fully mechanized harvest, the demand for migratory workers on the High Plains will decline in direct proportion to the increased use of strippers. At the same time, family and regular hired workers may be expected to contribute increasing proportions of labor to the total harvest requirements. These shifts likely will occur more rapidly on irrigated than on dry-land farms, as irrigation practices fit in more closely with the use of regular hired labor. The net effect will be to make available for other employment thousands of workers now needed during the fall on the High Plains.

SOURCES OF COTTON LABOR

The principal reason for selecting the High Plains as the sample area in a farm manpower study is illustrated in Table 4. A major labor-deficit area, the High Plains is dependent on migratory workers both to chop and to harvest cotton. In 1951, approximately half of the workers employed in the cotton-chopping and hoeing operations were migrants, while more than three-fourths of the cotton harvest workers came from outside the area.

These data involve some double counting, as they are derived from numbers of workers reported by each of the 324 farm operators in the sample. Some workers were employed

Table 4. Types of workers employed in chopping and pulling cotton, Lubbock and Crosby counties, 1951

Type of worker	Number and proportion of workers in each type[1]			
	Chopping and hoeing		Pulling	
	Number	Percent	Number	Percent
Total	40,888	100	58,210	100
Farm operators	801	2	135	[2]
Family workers	1,123	2	651	1
Paid	269	[2]		
Unpaid	853	2		
Regular hired workers[3]	1 699	4	1,160	2
Other locel workers[4]	16,896	42	11,341	20
Migratory workers	20,369	50	44,923	77

[1]A sum of all the workers reported by individual farm operators. Hence, workers who were employed on two or more farms have been counted twice. The probable extent of this multiple counting was not ascertained.

[2]Less than 1 percent.

[3]And members of their families.

[4]Originating within the High Plains cotton area.

by two or more operators, especially in cotton chopping. No attempt was made to eliminate this duplication. Similarly, the percentages apply to the distribution of labor by types of workers; they do not necessarily reflect proportionate contributions to total labor needs. In the eyes of the individual farmer, however, the data represent a labor-use pattern of considerable importance in cotton production.

Besides employing large numbers of migratory workers, cotton farmers on the High Plains also hired many local laborers. About two in five cotton choppers and one in five cotton pullers were employed locally (Table 4). Many of these local workers came from the city of Lubbock where a comparatively large pool of seasonal labor has developed since the war.

Regular hired workers did not figure prominently in the total labor force. Only 4 percent of the chopping laborers and 2 percent of the harvest laborers were of this type in 1951. Also, the operator and his family performed relatively little hand labor in the 1951 crop. Less than 5 percent of the workers who chopped cotton and less than 2 percent of those who pulled cotton were members of the operator's family.

Practices in the use of mechanical harvesting equipment varied according to the variety planted, yields, size of farm and tenure of the operator. However, most farmers favored hand pulling the first time over followed by machine stripping of the rest of the crop after frost had defoliated the plants. The role of the farmer in the harvest was strongly affected, in turn, by the use of machine strippers. As one farm operator put it: "A farmer can't afford to waste his time at hand labor. My son and I can go out with the stripper and get out 10 or 12 times as much cotton as we could both get together at hand pulling." This attitude carried over to their regular hired workers who were generally more productive in assisting at machine processes than in hand-labor operations.

A separate analysis shows that of the farmers who hand pulled any part of their crop, only 12 percent used any family labor in the operation. Only 2 percent harvested their entire crop with family labor.

At the other extreme, 86 percent of the farmers used some migratory labor in pulling their cotton, while 55 percent used migratory labor only. Dependence on workers from outside the area was almost universal. Only 11 percent of the farmers relied mainly on local off-farm labor for hand pulling, although 37 percent used some workers of this type.

Crew Workers

A few harvest workers employed by farmers in Lubbock and Crosby counties in 1951 came from Lubbock and other nearby towns in family groups or alone. Most of the cotton pullers, however, moved in crews which functioned as multi-worker units. Around 52,000 such crew workers were employed in the two counties during the harvest season (Table 5). These data were expanded to county totals from figures reported by each farmer in the sample. Duplication in the count occurs when crews were employed by more than one farmer.

Of this entire force of crew workers, 43,000, or 83 percent, were domestic Latin-Americans; about 5,500, or 11 percent, were Negroes; 1,900, or 4 percent, were Anglo-Americans; and the remaining 1,200, or 2 percent, were Mexican Nationals. Thus, in 1951, as for many years past, Latin-American migrants comprised the core of the harvest labor force.

More than three-fourths of the Latin-Americans originated in South Texas, although 9 percent came from Lubbock and other population centers on the High Plains. Most of the remainder moved onto the Plains for the harvest from East Texas and other areas within the State. Forty percent of all the Negroes employed in crews came from the city of Lubbock, with the next largest percentage coming from East Texas. South and East Texas together supplied about two-thirds of the Anglo-Americans, with somewhat more than half of this group coming from East Texas.

Table 5. Number and types of workers in crews, and home base of crews in the cotton harvest, Lubbock and Crosby counties, 1951[1]

Home base	All workers	Anglo-American		Latin-American		Negro		Others	
	Number	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	51,623	1,901	100	42,948	100	5,457	100	1,317	100
Lubbock city	3,945	157	8	1,580	4	2,208	40	0	0
Other places on High Plains	2,755	202	11	2,282	5	269	5	0	0
East Texas	3,481	719	38	823	2	1,939	36	0	0
South Texas	34,645	524	27	33,651	78	472	9	0	0
Elsewhere in Texas	1,782	45	2	1,363	3	374	7	0	0
Other states	344	127	7	217	1	0	0	0	0
Outside the U. S.	1,220	0	0	0	0	0	0	1,220	93
Don't know	3,451	127	7	3,032	7	195	3	97	7

[1]Applies only to crews in hand pulling.

Mexican Nationals

Imported laborers from Mexico accounted for only a fractional part of the total labor force. Other counties on the High Plains employed Mexican Nationals in 1949 and 1950, but their employment in Lubbock and Crosby counties in 1951 was in the nature of an experiment by all parties to the contract.

Results of the experiment were mixed. Only 3 percent of the farmers in Lubbock and Crosby counties used Mexican National workers in 1951. These counties had no private labor procurement organization for transporting Mexican Nationals from reception centers and distributing them among farmers. A local gin acted as agent of the Dawson County Growers Association in negotiating with the Texas Employment Commission to obtain Mexican Nationals and it placed approximately 1,200 workers in the two-county area. Other farmers obtained their workers directly through the Association rather than through the gin.

The main objection to the Nationals was summed up by many farmers as "too much red tape." Fees and expenses amounted to $30 per worker plus a $10 membership fee in the Association. Wages were paid at the "prevailing rate," or at 50 cents an hour or $1.50 per 100 pounds of cotton, whichever was higher. Employment equaling three-fourths of the period of the Nationals' stay on a farm was guaranteed by the farmer. Workers also were supplied with bedding, kitchen utensils and other items not normally furnished to domestic workers. Some farmers expressed reluctance to make these expenditures because they then would have no legal recourse if the workers did not remain as long as they had contracted to work.

A new agreement was negotiated by the Governments of the United States and Mexico concerning employment conditions for 1952. Meanwhile, 10 percent of the farmers interviewed in this study indicated an intention to employ Nationals in 1952. Two-thirds of the farmers who employed them in 1951, however, stated that they would not do so in 1952.

RECRUITMENT OF COTTON-HARVEST WORKERS

During the 1951 season on the High Plains, most of the workers and farmers made their own job contracts (Table 6). Farmers stated that 38 percent of the crews employed in

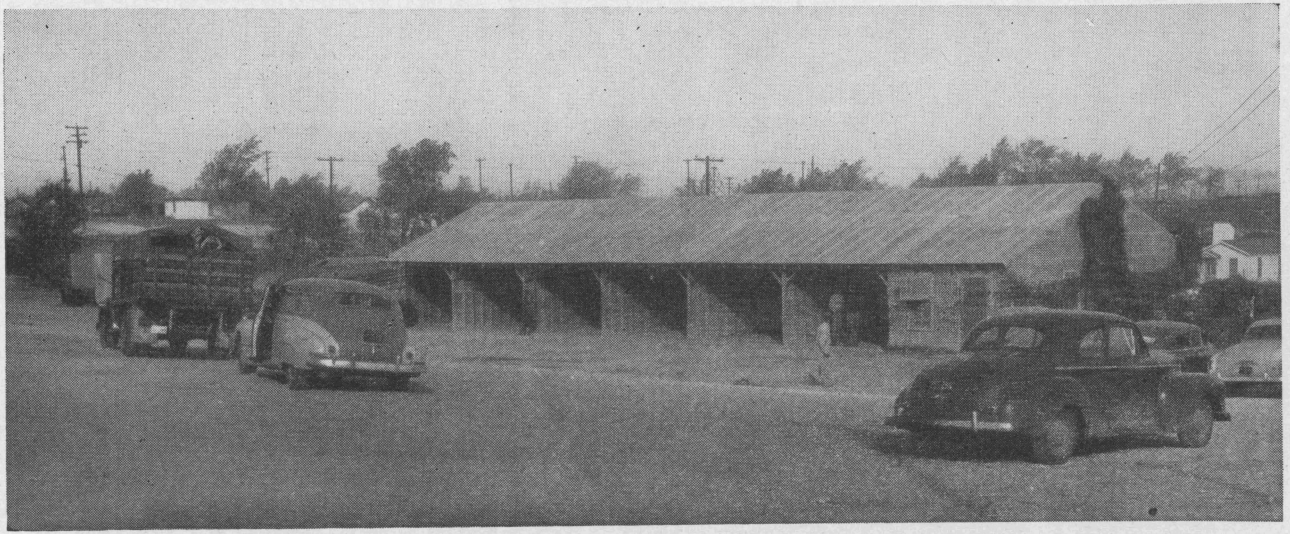

Figure 5. A reception center for migratory farm workers along the route to the High Plains. These centers provide sanitary and other facilities for workers and serve as recruitment and placement headquarters.

the harvest came to their farms of their own volition. An equal proportion of the farmers located crews for themselves. (A "crew" is defined as two or more workers traveling and working as a unit throughout all or most of the season. Most crews contain between 10 and 20 members, the average being around 16 members.) In short, about three-fourths of the crews were hired for the first time as a result of direct negotiation between employer and employee. Another 18 percent of the crews returned to work for farmers with whom they had made arrangements the previous year. In some cases, these arrangements had extended over several years.

Operators of large farms were somewhat more inclined than others to have arrangements that continued from year to year. More than a fourth of the large-farm operators had arrangements of this type. On medium-size farms, only one operator in eight had a continuing agreement with his crew.

Seven percent of the farmers reported that they had been helped by the Farm Placement Department of the Texas Employment Commission. According to the farmers interviewed, this office placed 4 percent of all crews and these comprised 5 percent of the workers. Operators of medium-size farms, on one hand, and Latin-American crews, on the other, made the most use of this organization's services.

Table 6. **Method of obtaining cotton-pulling crews, as reported by 324 persons, Lubbock and Crosby counties, 1951**

Method of recruitment	All crews	Crews by size of farms			Type of crew			
		Small	Medium	Large	Anglo-American	Latin-American	Negro	National
	Percent							
All crews	100	100	100	100	100	100	100	100
Crew came to farm	38	38	41	35	43	38	43	0
Operator located crew	38	41	36	38	39	38	37	33[1]
Crew obtained thru Farm Placement Department	4	2	6	3	0	4	2	34
Crew obtained thru Association	1	1	1	1	0	0	0	25
Continued arrangement from previous year	17	18	13	22	15	18	18	0
Others[2]	2	0	3	1	3	2	0	8

[1]Relating to farmer's activity in arranging for the work of Mexican Nationals on his farm, not specifically to his participation in their recruitment.

[2]Usually through friends or neighbors.

In addition to direct placements made by the Farm Placement Department, informational and directional services of this agency are designed to move workers from areas having an ample supply of labor into deficit areas. Some 250 crews consisting of 4,000 workers were directed, during the fall of 1951, into Lubbock and Crosby counties by Farm Placement representatives located at Brady, Abilene and other directional stations south of the High Plains. Many of the continuing arrangements, moreover, resulted from original placements made by this service.

The understanding of the farmer as to the recruitment of his labor is not always clear and accurate. In the case of this survey, it should be noted some 3 months had elapsed between the hand-labor operation and the date of interviewing, and this undoubtedly introduced a memory bias of some consequence. Another indication of misinformation on the part of farmers was noted in connection with the program for importing foreign workers. Of those farmers who used Mexican Nationals, about a third reported that they had recruited Mexican Nationals for themselves, while another third credited the Farm Placement Department with obtaining these foreign workers. Only 25 percent of the farmers identified the Dawson County Growers Association as the recruitment agency. Actually, this association cooperated with the Texas Employment Commission in recruiting all of the Mexican workers employed in the two counties in 1951.

MEN AND MACHINES IN THE COTTON HARVEST

Within certain limitations, machine strippers may be freely substituted for human labor in harvesting cotton on the High Plains. The extent to which such labor-saving devices are used, therefore, directly affects the demand for farm labor during the harvest season. Machine harvesting also is a factor in the farm labor situation of competitive producing areas and, indeed, in the total manpower picture of the State.

A number of studies of mechanical cotton harvesting have been made by the Texas Agricultural Experiment Station. Most of these were concerned either with the agronomic and engineering aspects of the problem, or with other specific phases of production efficiency. Although labor requirements had to be considered in those analyses, supply and use of labor were emphasized in the present study. Because of the interchangeability of human labor and machinery, the study, therefore, involved an appraisal of the use of the chief labor-saving device connected with the cotton harvest.

Use of Strippers, 1951

A completely mechanized cotton harvest now appears to be a distinct physical possibility on the High Plains. Although, in 1951, there were still technical difficulties in the way, the capacity of strippers on hand was adequate for the job. Two-thirds of the operators on the sample farms in Lubbock and Crosby counties owned strippers, and some owned two or more machines (Table 7). Some machine stripping was performed on 91 percent of the farms, although the entire crop was machine harvested on only 8 percent.

Although the sample farms in the two counties had a total of 244 strippers, only 230 strippers were used during the 1951 season. Many of the unused strippers were located in areas in which the cotton had blown out during windstorms, leaving little or none to harvest.

Custom stripping was fairly common in the area in 1951. Among the farmers owning strippers, 28 percent operated their equipment on other farms. Eight percent of those who owned strippers used them on two or more farms besides their own.

Thus, despite the extensive use of hand labor in the early weeks of the harvest, an impressive portion of the 1951 crop was harvested mechanically. A total of nearly 17,000 bales,

Table 7. **Use of machine strippers during the 1951 cotton harvest on farms surveyed in Lubbock and Crosby counties**

Item	Number	Percent
Total farms surveyed	324	100
Farms with strippers	218	67
Farms on which work with strippers was done	296	91
All work	28	8
Part of it	268	83
Total strippers on sample farms	244	100
Strippers used, 1951	230	92
Farmers who used strippers on other farms	60	28
Number other farms used on	90	
Farmers who used strippers on one other farm	43	20
On two	12	6
On three or more	5	2
Total bales harvested on home farm with strippers	18,703	100
With own stripper	17,168	92
With custom stripper	1,535	8
Average number bales harvested per stripper	83	
On home farms	75	
On other farms	8	

or 40 percent of the crop on the sample farms, was machine stripped. Ninety-two percent of these bales were harvested on the home farm and the remainder on other farms. This meant an average of 83 bales per stripper, with 75 bales harvested on the home farm and 8 bales on a custom basis.

Hand Labor Versus Machines

A great many factors affect the choice between harvesting cotton by hand and harvesting it by machine.

One decision that needs to be made before planting time is the choice of seed. Stormproof varieties should be planted if the cotton is to be harvested by machine, because they are not likely to suffer as much damage as open boll varieties, if harvest is not started until after frost kills the leaves (which is essential to successful machine stripping). This problem will diminish if chemical or other artificial defoliation becomes generally practical.

Other factors affecting the choice between harvesting by hand or by machine include the prevailing wage rates, yields per acre, acreage in cotton and tenure of the operator.

The prevailing wage rate is determined largely by the supply of labor in relation to the size of the crop. If wage rates are high, there is more advantage in machine stripping. If yields per acre are very low, mechanical stripping is advantageous because it is difficult and expensive to harvest a poor crop by hand. On the other hand, even though irrigation increases the yield per acre, it seems to have had little effect on the extent to which mechanical strippers were used.

Irrigation

Comparativly little difference was found in the extent of machine stripping of cotton grown on irrigated land and that grown on dry land. In both cases, about half of the crop was harvested by hand the first time over, and slightly less than 10 percent was hand pulled the second time over. Approximately 39 percent of the total irrigated cotton crop and 43 percent of the dry-land cotton was harvested by machine.

This difference in harvesting practices may be greater in other years. A series of hailstorms damaged plantings on irrigated land and reduced yields in a few areas of Lubbock and Crosby counties. The average yield on all irrigated land in the sample, based on 500-pound bales, was 489 pounds of lint per acre. On dry land, the average was 136 pounds of lint per acre.

Farm Size

Cotton was harvested by machine on a much higher proportion of medium-size farms than of large or small farms. Fifty-seven percent of the crop on farms of medium size, 35 percent on large farms and only 16 percent on small farms was machine stripped.

On some small farms, the acreages of cotton, along with the low yields of 1951, were not large enough to justify ownership of a mechanical stripper. It was not uncommon, therefore, for all the cotton on these units to be hand pulled, frequently with the help of the family. Big irrigated fields attract migratory workers and make possible the hand harvesting of more than half the crop the first time over and another 13 percent the second time over. The large-farm group, however, included also a number of dry-land units on which the entire crop was handled by machine.

Without regard to size of farm, 9 percent of all operators in the sample hand pulled their entire crop, while 8 percent harvested the whole crop with strippers. The prevailing pattern of the harvest was one hand-pulling operation, followed 2 or 3 weeks after frost by stripping. Unusually heavy ground losses from stripping in 1951, plus favorable prices, caused some farmers to send workers through the fields picking up cotton by hand after the stripper.

Tenure

Perhaps the most important fact disclosed by this study is that full mechanization of the cotton harvest is becoming more and more dependent on the solution of institutional problems as rapidly as the technological problems are solved. Tenure of the farm operator was an exceptionally important factor affecting the amount of stripping done in 1951.

On farms operated by full owners, 68 percent of the crop was harvested by machine, as compared with only 26 percent of the cotton produced by tenants (Table 8). Part owners, who owned some of their land and rented the remainder, harvested 29 percent of their crop with strippers as did those in "other" categories of tenure, such as partnerships, estates and managing share-croppers.

The role of tenure in the development of mechanical harvesting is especially striking when the size of farm is held constant. Comparisons involving part owners and "others"

are not meaningful because of the mixed nature of these two tenure categories. However, the contrast between full owners and tenants offers convincing evidence of the effect of the tenure arrangement on the use of harvest machinery.

On large farms, full owners stripped 53 percent of the crop, as compared with only 28 percent for tenants. On medium-size farms the difference was even greater—82 percent for full owners and 39 percent for tenants. A third of the crop on small farms operated by full owners was stripped, while stripping accounted for only 11 percent of the crop on tenant-operated small farms.

This raises a question as to whether the cost of mechanical strippers is the reason for their more general use by owner-operators than by tenants. Apparently it does not. A new stripper during the 1947-49 period cost about $925 and a trailer about $720. This is a relatively modest investment for most tenants operating on the High Plains. Moreover, cus-

Table 8. Method of harvesting cotton according to irrigation, size of farm and tenure of operator, 324 farms in Lubbock and Crosby counties, 1951

Irrigation, farm size, tenure	Total bales	Number and proportion of bales					
		Hand-pulled first time over		Hand-pulled second time over		Harvested by machine	
	Number	Number	Percent	Number	Percent	Number	Percent
All bales	47,061	23,984	51	4,374	9	18,703	40
By types of land							
Irrigated	34,323	17,772	52	3,274	9	13,277	39
Dry land	12,738	6,212	49	1,100	9	5,426	43
By tenure and farm size							
Full owners	14,230	3,653	26	886	6	9,691	68
Large	4,729	1,737	37	463	10	2,529	53
Medium	8,214	1,320	16	161	2	6,733	82
Small	1,287	596	46	262	21	429	33
Part owners	9,681	5,548	57	1,197	13	2,936	30
Large	5,957	3,378	57	837	14	1,742	29
Medium	3,174	1,870	59	296	9	1,008	32
Small	550	300	55	64	12	186	34
Tenants	22,163	14,227	64	2,148	10	5,788	26
Large	9,125	5,292	58	1,237	14	2,596	28
Medium	6,282	3,107	50	705	11	2,470	39
Small	6,756	5,828	86	206	3	722	11
Others	987	556	56	143	15	288	29
Large	570	300	53	65	11	205	36
Medium	260	189	73	54	21	17	6
Small	157	67	43	24	15	66	42

tom stripping has become fairly common in the area and is available to most of the operators who have not already bought strippers of their own.

An important reason for the direct effect of tenure on the use of mechanical strippers is found in Bulletin 735 of the Texas Station.

That bulletin showed that under the customary lease, the tenant pays all the on-farm production expenses and, therefore, receives the benefits of savings in the wage bill attributable to machine harvesting. The landlord's share, however, is adversely affected by the reductions in grade and the greater ground losses associated with machine harvesting of the entire crop after frost, in contrast with complete harvesting by hand, much of it at an earlier date.

Under the circumstances described in that study, returns to the landlord in 1947-49 averaged between $3.00 and $4.00 less per bale on machine-stripped cotton than on handharvested cotton. However, the use of mechanical strippers apparently increased the net returns to tenants much more than it decreased the returns to landlords. Therefore, the use of strippers was profitable from the standpoint of the farm enterprise as a whole. A redistribution of expenses was suggested as a means of avoiding this loss of income to the landlord without discouraging the use of machine strippers on rented land. There are undoubtedly a variety of arrangements possible for doing this. If, for example, the tenant paid the entire ginning bill on machine-stripped cotton, the sharing of net returns would be about the same regardless of the method of harvest.

The present study was not designed to analyze tenure relations. It reveals, however, that the proposed adjustment in lease agreements has not been made on many rented farms, and that this "institutional lag" was slowing down the achievement of a widely accepted goal—a fully mechanized cotton harvest on the High Plains.

The specific methods used by landlords in 1951 to encourage hand pulling, or to discourage machine stripping, were not ascertained. It is an easy matter, however, to control by contract the approximate ratio of machine use to human labor in the cotton harvest. A provision in the lease requiring the tenant to hand-harvest the crop the first time over is one method. Another is to require the planting of seed of open boll varieties. Windstorm damage is an ever-

present hazard on the High Plains and machine stripping under existing practices necessitates leaving the mature cotton in the field for perhaps 6 weeks until frost has defoliated the plants. Thus, if the labor supply is available, no prudent operator will run the risk of waiting until conditions are favorable for machine stripping, unless his cotton is a storm-resistant variety.

Other studies in recent years have demonstrated that, under optimum conditions, machine stripping is economical on the High Plains. This study shows that owner-operators are taking advantage of the profit opportunity of mechanical harvesting to a much greater extent than are tenants. It suggests that both landlord and tenant might benefit by modifying their lease agreement so as to share the saving in costs, or the higher net returns, associated with mechanical harvesting.

LABOR TURNOVER

Cotton farmers on the High Plains are concerned with two types of seasonal labor mobility. One involves the timely movement of harvest crews *into* the area as the crop matures. The other involves the movement of crews *within* the area during the season.

The arrival of large numbers of workers on the High Plains each fall may substantially solve the harvest problem from the standpoint of the total area. It does not, however, assure the individual farm operator of an uninterrupted harvest on his own farm. Having obtained the services of cotton pullers, he then strives for a minimum turnover in his labor force, at least until his fields have been pulled over the first time. Continuity in the employment of harvest workers, other conditions being favorable, is a goal which employer and employee quite understandably share. Excessive labor turnover can be costly to both parties.

Since June 1950, another type of manpower loss has occurred on the High Plains, as well as in the rest of the country. Following the outbreak of the Korean conflict, the expansion of the armed forces and of production for defense purposes began exerting additional pressure on the available manpower. On the High Plains, this increased labor demand probably affected the supply of regular hired workers and the family labor force more than seasonal migrants. The net result, however, was to bring the farmer into more direct competition for workers with industry and the armed forces, as was the case during World War II.

Reasons for Loss of Crews

It has been indicated that about 18 percent of the crews employed in 1951 had returned to the same farms under a continuing arrangement with the operator. At the other extreme, some operators hired and lost as many as four different crews before completing their cotton harvest.

Of the crews employed on sample farms, 32 percent left the farmer before the end of the season (Table 9). A few of these crews were on loan from other cotton farms in the area, and their leaving was simply in compliance with their contractual obligations.

Another 3.5 percent of all crews employed and 11 percent of those who left before the season ended, gave as their reason a desire to put their children in school. In this group were families who returned home, usually to South Texas, at about the time schools opened in that area. Doubtlessly associated with this reason was the arrival of the first "norther". The school needs of the Latin-American children frequently coincide in timing with the distaste of their parents for cold weather.

Information was not obtained from farmers on a second type of migration in connection with the schools. This was the movement between school districts on the High Plains. The amended Federal Fair Labor Standards Act resulted in certain of the schools being closed temporarily during the peak of the harvest. During the cotton harvest season, some workers moved their families into districts where schools were

Table 9. Reasons given for crews leaving farms before the end of the cotton harvest, Lubbock and Crosby counties, 1951

Reason for leaving	Percent of	
	All crews	Crews which left
Total crews in harvest	100	
Crews which remained to end of season	68	
Crews which left before the end of season[1]	32	100
Dissatisfaction with wage rates	7	22
Dissatisfaction with earnings	2	6
Dissatisfaction with poor field	4	12
Dissatisfaction with light yield	3	8
Dissatisfaction with housing		1
To put children in school	3	11
To return to regular employer	1	3
Miscellaneous	11	36

[1]"End of season" was determined by answers to the question: "Did this crew stay with you as long as you wanted them?"

closed in order that the children might work without violating the law.

Dissatisfaction with wage rates was given as the reason by farm operators for 22 percent of the crews that left farms before completion of the harvest. This reason was closely associated with an unsatisfactory level of earnings, an explanation given for the departure of another 7 percent of the crews that left.

Poor fields and light yields, frequent causes of labor recruitment problems for farmers and likewise a factor in low earning levels for workers, were cited in the case of 20 percent of the crews as their reason for leaving. Harvest workers, especially in the larger crews, traditionally have been reluctant to work in low-yielding fields. The experience of farmers in 1951, when the crop in local areas was damaged by hail, indicates that workers are likewise inclined to leave a crop when production proves to be disappointing. In some instances, farmers meet this worker-resistance to poor fields with higher wages; in others, they rely on the use of machine strippers.

Dissatisfaction with housing ranked least important of all the specific reasons advanced for the early departure of crews. This has not always been the situation on the High Plains. Lack of housing once seriously handicapped completion of the late harvest. But, in 1951, 77 percent of the farms in this sample had labor houses on the place. This appears to meet at least the minmum requirements, particularly since crews often establish headquarters on a farm having housing facilities and work both there and on other farms in the neighborhood.

Miscellaneous reasons were reported as causing the remainder of the crews to leave certain farms early. Many of these were of a personal nature, such as sickness or death in the family, trouble in the crew or with other crews, arrest, or a desire to join friends or relatives at work on other farms. When one crew or family left, a chain of events involving other crews frequently ensued, thereby increasing the total labor turnover.

Losses of Workers Since June 1950

The problem of manpower losses and labor stringency during the 1951 season did not center around hand labor for chopping or pulling cotton. It centered, instead, around a

lack of experienced help to handle machine operations in cultivating, stripping and in similar tasks. This occurred on a small number of farms, but not in cotton production generally. Some farmers had sons or regular farm hands who had gone into the armed forces after June 1950, the date of the Korean outbreak; a few had lost workers to nonfarm employment. Some lost regular hired workers who moved to other farms.

Since the outbreak of hostilities in Korea, 165 farmers in Lubbock and Crosby counties had sons who left for service in the armed forces or to enter nonfarm employment. By February 1952, a total of 149 sons had gone into the armed forces and 37 had left farm work to take nonfarm jobs (Table 10). These manpower losses affected only 7 percent of the farm operators, but they sometimes constituted a serious handicap on individual farms. All but a few of the sons who left had done some work in cultivating during their last year on the farm, most had assisted in stripper operations and somewhat fewer than half had done some work in pulling cotton by hand.

Table 10. **Number and activity of family and regular hired workers who left cotton farms in Lubbock and Crosby counties after the outbreak of Korean hostilities to February 1952**

Reason for leaving	Total leaving	Total who worked in cotton	Members of operator's family		Regular hired workers	
			Worked in cotton	Did no work in cotton	Worked in cotton	Did no work in cotton
	Number					
All workers leaving[1]	387	329	172	14	157	44
To go into armed forces	202	180	142	7	37	15
To go into defense work	7	0	0	0	0	7
To go into nonfarm work	67	60	30	7	30	0
To farm for self	0	0	0	0	0	0
To work on other farms	60	60	0	0	60	0
Other reasons	52	30	0	0	30	22

Cotton operations engaged in by those who left[2]	All workers who left	Members of operator's family	Regular hired workers
	Number		
Cultivating	329	172	157
Chopping and hoeing	254	142	112
Stripper operations	172	112	60
Hauling	142	112	30
Weighing	104	82	22
Pulling	112	90	22

[1]Expanded to county totals from samples of 324 farms.
[2]During last year on farm.

Only 45 farmers had hired workers to replace their sons in their farm operations. Data were not obtained as to how many of the other operators had tried to obtain replacements and failed, or how many did not look for replacements. It was common for them to state, however, that inability to obtain competent labor had been a major problem during the 1951 season.

Expanded totals from the sample data indicate there were 1,160 regular hired workers on cotton farms in the two selected counties. They worked on 808 farms, or one-third of all cotton farms in the area. A total of 157 regular workers, or approximately 15 percent of the entire number, had left these farms since the Korean outbreak. Somewhat more than half of them had simply left to work on other farms but 24 percent had gone into the armed forces and 19 percent into nonfarm employment. Although these losses occurred to only 6 percent of all farmers in these counties, they affected 18 percent of all farmers who employed regular farm workers. Seventy-eight percent of the regular hired workers who left had worked in cotton during their last year on the farm. All these had assisted in cultivating, most had engaged in chopping and hoeing, fewer than half had worked in stripper operations and only 10 percent had done any hand pulling.

Of the 150 farmers who had lost regular hired workers, 135 had obtained replacements. Only 10 percent had not done so. Of these 150 farmers, 60 percent stated that they had ex-

Table 11. Percentage distribution of farmers, by wage rates, for chopping and hoeing cotton, Lubbock and Crosby counties, 1951

Farm characteristics	All farmers paying hourly rates[1]	Proportion of farmers who paid (per hour):[1]		
		50-55 cents	60-65 cents	70 cents or more
	Percent			
All farms	100	10	61	28
Irrigation				
Mostly irrigated	100	14	61	25
Mostly dryland	100	7	60	32
Tenure[2]				
Owners	100	11	58	32
Tenants	100	8	65	27
Farm size				
Large	100	10	60	30
Medium	100	10	61	29
Small	100	11	61	28

[1]Other rates not included in this table include day wages, usually at $5.00 or $6.00 per day.

[2]Operators with miscellaneous types of tenure omitted. Owners include part owners.

perienced difficulty in finding a replacement, as compared with 40 percent who reported that they had no great difficulty.

WAGE RATES

Farmers were asked the rates they had paid for chopping and for pulling cotton during the 1951 season. The most common rate for chopping cotton was 65 cents an hour, although almost as many farmers paid 60 cents. Ten percent of the farmers paid less than 60 cents, 29 percent paid 70 cents or more (Table 11). A few farmers paid by the day but the hourly rate was the standard for the area.

Variations in the level of wage payments with irrigation, tenure and size of farm were not of great significance. Farmers on irrigated land averaged paying somewhat higher rates than those on dry land. Tenants were more inclined than owners to pay the average rate, while owners were more likely to pay above or below the average. Wage rates increased slightly with the size of the farm operation.

Harvesting Rates

Questions asked in regard to rates for pulling cotton were designed to show changes in wages during the season as well as to ascertain the level of rates paid. The usual practice among farmers in this area was to pay a combined rate for pulling the cotton and hauling it to the gin. The crew leader then could make a return from the truck in which he transported his crew to the area. Two-thirds of the farmers paid on this basis in 1951. The usual rate for hauling was 25 cents a hundred pounds of seed cotton. This figure was deducted in the case of all combined rates so as to arrive at a net figure for pulling cotton. These net figures were used in tabulating the rates for 1951 (Table 12).

Wage Rate Changes

A few farmers started paying $1.25 a hundred pounds at the beginning of the season, but all in this group were paying $1.75 before the season was over. Approximately one-third started paying $1.50 a hundred, but 73 percent of these also raised their rates to $1.75 or $2.00 before the end of the season. More than one-third of the operators started paying $1.75 at the beginning of the season, but 40 percent of these farmers raised their rate, usually to $2.00. One-fourth started paying $2.00. Of these farmers, 21 percent increased the rate during the season, usually to $2.25; 13 percent, however, re-

Table 12. Starting wage rates for pulling cotton in 1951 and changes during the season, Lubbock and Crosby counties

Starting rate	Proportion of farmers who					
	Started at this rate	Paid this rate all season[1]	Increased rate[1]		Decreased rate[1]	Both increased and decreased rate[2]
			Once[2]	Twice[2]		
	Percent					
All farmers	100	46	32	15	4	3
$1.25 - 1.35	2	0	29	71	0	0
$1.50 - 1.60	32	24	42	31	0	3
$1.75 - 1.85	37	53	34	6	2	5
$2.00 - 2.10	26	64	21	1	13	0
$2.25 and up	3	86	0	0	0	14

[1]Most increases and decreases were in terms of 25-cent intervals. A few were of 5 and 10 cents, a few also were of 50 cents and one of $1.00.

[2]Percentage is proportion of those who started paying a given rate.

duced the rate, usually by 25 cents a hundred pounds. Only a few farmers started paying $2.25 a hundred and this group usually paid the same rate throughout the season.

Almost half of the farmers then increased their rates above the first offering of the season. The trend was not entirely upward, however, as 7 percent of the farmers reduced their rates while the harvest was in progress. Changes in rates were common on farms that had either all irrigated or all dry-land cotton, and occurred on large, medium and small farms with about equal frequency.

SPECIAL PROBLEMS IN THE 1951 HARVEST

Lack of Labor

Farmers were questioned as to the problems they had experienced in connection with the harvest. Forty-five percent responded that they had no problems, that the harvest had proceeded smoothly. Thirty percent stated that they had lacked labor at some time during the harvest period (Table 13). For some, it was a lack of regular workers to operate the stripper or to assist with general duties about the farm; for others, it was inability to get harvest workers at the time they were needed.

Crowded Gins

Next in importance to the problem of lack of labor was that of overcrowded gins. Almost 20 percent of the farmers indicated that they had been hampered in their operations by having to wait at gins to unload their cotton. Some farmers hauled cotton as far as 60 miles to get their trailers unloaded. Some gins assigned unloading days for all farmers in the area.

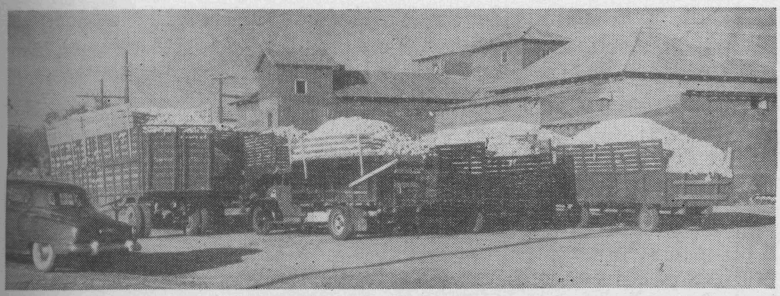

Figure 6. Cotton trucks and trailers waiting their turn at the gin. Because of the expanded High Plains cotton acreage since the war, gins are frequently crowded during the peak of the harvest season.

Other Problems

Some farmers were handicapped by poor cotton, by cotton stalks too short to be handled easily by the strippers and by similar circumstances which arose from the dry weather or other adverse climatic conditions.

A new problem appeared in 1950 and caused additional concern in 1951. This was the amended Fair Labor Standards Act, or the "School Law." Enforcement officers came into the area in 1951 and issued warnings in a few cases. In many of the rural school districts, the situation was simply met by closing the schools until the harvest was over, thereby permitting the children of migrants to work legally. Farmers in most urban districts were not able to close their schools in

Table 13. **Farmers reporting problems in connection with 1951 cotton harvest, frequency and order in which those problems were reported, Lubbock and Crosby counties**

Farmers and problems	Number[1]	Order in which problems were reported		
		First	Second	Third
Total farmers reporting	324			
Farmers with no problems	146			
Farmers with problems	178			
Types of problems				
Lack of labor	100	93	7	0
Crowded gins	60	44	16	0
Poor cotton	14	11	3	0
Child labor law	17	9	6	2
Weather	13	8	4	1
Lack of housing	8	6	2	0
Other	13	7	6	0

[1]The number of farmers in the survey who mentioned a specified problem and indicated it as first, second or third in importance.

spite of claims that they were losing workers to the areas in which children could work. Community protests over the situation were reflected frequently in the comments made by the farmers.

EFFECTS ON PLANS FOR 1952

How did the 1951 farm labor experience of operators in Lubbock and Crosby counties affect their farm plans for 1952? This question was approached by linking it to problems encountered in the 1951 harvest and by relating the labor outlook for the coming year to such specific adjustments as possible reductions in cotton acreage, increased use of machine strippers and the contracting of imported workers. Many of the operators did not anticipate making any important changes in their farm plans because of the labor outlook for 1952 (Table 14).

Increased Stripper Use

Half of the farmers interviewed stated that they had no expectation of taking any of the lines of action indicated for coping with the labor situation (Table 14). Purchase of more strippers was mentioned most frequently as a method for solving the labor problem; 23 percent of the operators indicated an intention either to buy their first stripper or to add another machine to those already on hand. Seven percent expected to contract for custom stripping, 9 percent planned to keep their cotton acreage down and 11 percent planned to employ foreign workers.

Increased stripper use did not appear to be strongly associated with size of farm or status of mechanization on the farms. But a slight tendency was indicated toward an expansion of stripper use on larger units and on units on which only a part or none of the crop was machine harvested in 1951. Wage rates paid at the start of the 1951 harvest season, however, seemed to have had some effect on plans for using strippers. Of those operators who began the season by paying $1.50 a hundred pounds for hand pulling, 32 percent expected to buy more strippers or to hire custom stripping done. This compared with 26 percent of the operators paying $1.75 a hundred pounds at the start of the season and 38 percent of those paying $2.00.

Use of Foreign Workers

Farm size and wage rates figured in the intentions of operators to contract for imported labor. Among operators of

large farms, 16 percent expected to employ foreign workers in 1952, as compared with 9 percent of the operators of medium-size farms and 6 percent of the operators of small farms. Farm employers who paid the lowest wage rate at the start of the 1951 season were inclined more than other farmers to plan on employing foreign workers. Fifteen percent of those who paid $1.50, 9 percent of those who paid $1.75 and 10 percent of those who paid $2.00 reported that they intended to contract for imported labor the following season.

Loss of Year-round Workers

Farmers who had lost family or regular hired workers since the outbreak of Korean hostilities were most affected of any group by plans to curtail their acreage in cotton. Also, in the absence of dependable machine operators, these farmers were less prone than others to depend on the purchase of new strippers for harvesting purposes. Seventeen percent of the operators in this category planned to keep down their cot-

Table 14. **Effect of labor outlook for 1952 on farming plans, 324 farm operators, Lubbock and Crosby counties**

Operator classified by selected items	Total	Proportion of farmers reporting that 1952 labor outlook will lead them to:				
		Keep cotton acreage down	Buy more strippers	Contract for custom strippers	Contract for imported labor	Do none of these things
	—Percent—					
All farmers	100	9	23	7	11	50
By size of cotton acreage						
Small	100	11	19	9	6	55
Medium	100	6	25	6	9	54
Large	100	12	23	6	16	43
Extent of mechanization of harvest, 1951						
None	100	8	18	10	13	51
Some	100	10	24	7	11	48
All	100	4	20	4	4	68
Starting rate for pulling per 100 pounds, 1951						
$1.50	100	9	27	5	15	44
1.75	100	10	21	5	9	55
2.00	100	12	26	12	10	40
Other	100	4	20	10	6	60
Loss of labor since Korea[1]						
Some	100	17	17	8	8	50
None	100	9	23	7	11	50

[1]Either family or regular hired workers.

ton acreage and an equal proportion planned to buy strippers. Of the operators who had lost no year-round workers, only 9 percent expected their cotton acreage to be adversely affected, while 23 percent expected to buy more strippers.

Adjustments in Operating Scale

A separate question concerned with plans for reducing the acreage in farms reflected relatively unimportant changes in total acres to be farmed by operators in 1952. The aggregate reduction in 1951 acreage reported for 1952 was less than 1 percent. This slight drop was due mainly to the fact that 4 percent of the respondents planned to quit active farming operations in 1952. Those who were continuing to farm planned to increase their acreage by 2 percent. Most of the changes were being made by tenants and part owners who were shifting their holdings for the following year.

SUMMARY AND CONCLUSIONS

Among the different type-of-farming areas in Texas, the High Plains cotton area requires the heaviest volume of nonlocal labor during the cotton harvest. In recent years, however, rapid progress has been made toward full mechanization of the crop, making of the High Plains an excellent locale for analyzing the effects on manpower of a major transition from hand labor to machine use.

The Texas Agricultural Experiment Station and the Bureau of Agricultural Economics of the U. S. Department of Agriculture undertook this study to provide needed information about the types, source and use of labor in the cotton crop of the High Plains. The results are intended to be of practical value to farm employers and workers, as well as to local, state and national agencies concerned with problems of farm manpower supply, recruitment and utilization.

Lubbock and Crosby counties, where 324 farm operators were interviewed in February 1952, are typical of the High Plains cotton area with its commercial, family-operated farms and its highly mechanized methods of operation. Although the average rainfall is only about 20 inches, irrigation has expanded rapidly in recent years, and yields of a bale to the acre are not uncommon. Full owners and managing share tenants are the most common tenure groups. They are about equal in number, but part owners comprise an important third category. In any year, the area is dependent on a large volume of migratory workers for the cotton harvest. In 1951, partly

because of drouth conditions to the south, a sizeable number of these workers made a timely appearance for the harvest. Machine strippers, moreover, were generally available, and 9 out of 10 operators harvested part or all of their crop mechanically.

It was found that the type of labor used in cotton production on the High Plains depended largely on whether a particular operation was handled by machine or by hand labor. Farm size was also a factor in the labor-use pattern. The operator and his family contributed more than half of the labor connected with cultivation and slightly less than half of the labor of the stripper operation, but this group performed very little of the hand labor of hoeing, chopping and hand pulling. Migratory workers accounted for about four-fifths of the hand pulling and two-fifths of the hoeing and chopping. Regular hired workers chiefly supplemented the labor of the farm family as machine operators, while local seasonal workers participated to some extent in each type of activity, especially hoeing and chopping.

An estimated 41,000 "hoe hands" and 58,000 harvest workers were employed in the two counties in 1951, although these figures involved some duplication in the count of workers employed on more than one farm. Nearly 52,000 of the harvest workers were members of crews consisting of about 10 to 20 persons each. Domestic Latin-Americans comprised 83 percent of these crew workers, 11 percent were Negroes, 4 percent were Anglo-Americans and 2 percent were Mexican Nationals. Thus, in 1951, as for many years in the past, Latin-Americans from South Texas were the core of the harvest labor force. Recruitment methods were generally informal; farmers reported that nearly three-fourths of the harvest crews either came to the farm of their own volition or were located by the farmers themselves. Most of the remainder were employed as the result of arrangements made in the previous year. The Farm Placement Department of the Texas Employment Commission functioned as the public agency responsible for the recruitment, routing and placing of workers.

Machine stripping of cotton on the High Plains has increased rapidly in recent years. Forty percent of the 1951 crop was machine stripped, most of it after an initial hand pulling. Two-thirds of the 324 farms had strippers and some stripping was done on 9 out of 10 of these sample farms. Custom stripping was relatively common; 28 percent of the operators who owned machine strippers used them on one or more

farms besides their own. Irrigation had little apparent effect on the extent of mechanical harvesting. Size of farm figured in the use of machine strippers, however, as the most extensive use of the equipment occurred on medium-size farms (125-250 acres in cotton), followed by large farms of more than 250 acres in cotton and small farms of less than 125 acres in cotton. In each of these size-groups, however, the tenure of the operator proved to be the most significant factor in determining the amount of stripping. Because of the inflexible nature of customary leasing arrangements, full owners harvested mechanically between 2 and 3 times as high a proportion of their crop as did tenants.

Labor turnover during the harvest, which is frequently costly to both employer and employee, was identified mainly with dissatisfaction over wage rates or earnings. Farmers reported that housing—now available on 77 percent of the farms in the area—no longer appears to be important in the decision of harvest crews to leave a farm before the end of the harvest. Other reasons given for loss of crews included the desire to put the children of workers in school, the desire to return to regular employers and a number of personal reasons. Since the Korean outbreak, about 15 percent of the regular hired workers on farms in the two counties have left for other farm jobs, the armed forces or nonfarm employment. Seven percent of the farmers reported they had sons who left the family working force during the same period. Because many of these regular hired workers and sons of farmers were experienced machine operators, workers to replace them were often hard to find.

Wage rates for hoeing and chopping were fairly uniform in 1951 and did not seem to be greatly affected by such factors as irrigation, tenure or size of farm. Three-fifths of the operators paid 60 to 65 cents an hour for this pre-harvest labor, and most of the remainder paid 70 cents an hour. Starting rates for cotton pulling varied, however, from $1.25 to $2.25 and up per hundred pounds. Increases in pulling rates were common during the season, especially among those who started paying at the lower figures, although 7 percent of the farmers reduced their rates while the harvest was in progress. The most common rate was between $1.75 and $2.10 per hundred pounds.

Farmers cited lack of labor as the chief problem connected with the 1951 cotton harvest. Other problems reported included crowded gins, poor cotton, the child labor law and adverse weather. The principal methods planned or anticipated

for coping with these problems in 1952 were the increased use of machine strippers, employment of foreign workers and, in a few cases, reduction of cotton acreage.

This study was made in an area of transition. The High Plains may prove to be the first area in the Cotton South to mechanize fully its production of the nation's number one labor-consuming crop. What does the High Plains have to contribute to our knowledge of manpower conservation and use?

If, in a broad sense, the answer could be embodied in a single phrase, perhaps it would be *the need for education.*

The analysis demonstrates that advancing technology calls for machine skills, and these can best be provided by conscious educational programming. It shows that mechanization will reduce, or eliminate, the need for a vast stream of migratory workers in cotton production, and it strongly suggests occupational re-training of these workers to fit them for other useful employment. It indicates that farmers themselves have an increasing responsibility on their own farms for training and supervising their employees in the operation of farm machinery and in the performance of other farm operations requiring skill and judgment. It shows that the economies of mechanical harvesting are in part being lost by the institutional rigidities of the tenure system, a deficiency that can be overcome by vigorous and realistic farm-lease education. It reveals a lack of understanding of the values to be gained through a wider use by farmers of public employment services. The experience in connection with the "school law" underlines a basic need of long standing—an adequate program of elementary and high school education for the children of migratory workers.

These are some of the educational approaches to improved manpower utilization suggested by findings of this study. There are, no doubt, many other worthwhile steps that should be considered. For example, in the research field, there are rich possibilities for extending the benefits of labor-saving devices of proved efficiency; among other things, this means a thoroughgoing analysis of systems of land tenure on the High Plains and elsewhere in the South. Still another is the strengthening and enlarged support of public employment services.

But an acceleration of educational activity, much of it by agencies and groups already equipped for the task, probably offers the greatest rewards at the least cost. That such programs would also be in accord with the general economic

and social objectives of the State and the Nation provides the final affirmation of their worth. And while these objectives have been highlighted by the pressing demands of defense preparation, increased labor productivity remains through all phases of economic activity a goal of the farmer, the worker and the public.

METHODOLOGY OF THE SURVEY

The survey in Lubbock and Crosby counties was one of several farm manpower research projects carried on jointly by the Bureau of Agricultural Economics and several land-grant colleges. In other states, some studies were made in areas which are usually identified with a labor surplus. The Texas High Plains, on the other hand, has long been regarded as one of the Nation's major labor-deficit areas at the height of the cotton harvest.

Area sampling was used as a basis for selecting the farmers to be interviewed. In the two counties, there were 626 sample segments, as defined in the development of the Master Sample of Agriculture, from which a geographically stratified random sample of 96 segments was selected. All cotton farmers with their farm headquarters inside these segments were interviewed. Farmers who owned land inside the segments, but had their farming headquarters outside, were not included. Farmers who merely lived elsewhere, as in Lubbock or other cities, but did not farm there, were counted in the segment in which they had their farming headquarters.

The sampling rate was 15.3 percent (96 out of 626), whereas the number of cotton farmers identified in the sample segments, 372, was 12.9 percent of the number of farmers reporting cotton in the 1950 Census. Part of this difference results from the fact that the sample was confined to the open country. Schedules were completed for 324 farms, or 87 percent of 372 farms identified as being in the sample.

In expanding the sample figures to represent totals for the two counties, an expansion factor of 7.486 ($626 \div 96 \times 372 \div 324$) was used. One exception to this was in the calculation of the number of mechanical strippers. In some sample segments, all the cotton was blown out by windstorms. In these segments, no schedules were obtained, as no cotton harvest operations had taken place, although some of the operators had mechanical strippers. It was assumed that these non-reporting operators had strippers in the same proportion

as other farmers. An expansion factor of 7.646 provided an adjusted figure for the total number of strippers in these two counties. Expanded figures were used, however, only where it was believed that county totals were possibly significant for measuring labor supply and turnover (See Tables 4, 5 and 9).

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BIBLIOGRAPHY OF RELATED MATERIALS

Materials on the supply of seasonal farm labor in Texas in the past have consisted largely of estimates prepared to meet administrative needs in connection with public programs. Actual surveys have been made only during periods of labor stringency when it became necessary to take account of the manpower resources available to harvest the cotton and other heavy labor-using crops. On the other hand, a continuing series of studies has been made on labor requirements for all major crops, operations and areas. While these have provided information on significant changes in labor use, they have not dealt with the volume of manpower supplies nor with the extent to which those supplies were utilized.

These materials, some of which are out of print, then provide a considerable volume of background data in regard to the use of seasonal labor in Texas. For the High Plains cotton area in particular a series of analyses is available which deals with changes in costs and labor requirements, and in re-

turns to the farmer as affected by the use of mechanized harvest methods. The most recent of these include:

1. "Economics of Mechanical Cotton Harvesting in the High Plains Cotton Area of Texas." M. N. Williamson, Jr., Q. M. Morgan, and Ralph H. Rogers. Bulletin 735, Texas Station. 1951.
   This publication summarizes the findings of the six listed below on the following subjects: extent of use of machine and hand harvesting, stripper performance and costs, comparison of returns from machine and hand harvesting methods.
2. "Harvesting Cotton in the High Plains Area of Texas: Machine vs. Hand." Troy Mullins. Texas Station. Progress Report 952. Aug. 31, 1945. (Not available.)
3. "Cotton Production Practices in the High Plains Area, 1947." M. N. Williamson, Jr. and Ralph H. Rogers. Texas Station. Misc. Publication 37. Feb. 20, 1950. (Not available.)
4. "Economics of Cotton Harvesting, Texas High Plains, 1947 Season." M. N. Williamson, Jr. and Ralph H. Rogers, Texas Station. Progress Report 1134. Oct 1, 1948. (Not available.)
5. "Factors Influencing Cotton Harvesting Methods on the High Plains." D. L. Jones and Harold D. Lynn. Texas Station Progress Report 1029. Aug. 27, 1946. (Not available.)
6. "Economics of Cotton Harvesting, Texas High Plains, 1948 Season." M. N. Williamson, Jr. and Ralph H. Rogers, Texas Station. Progress Report 1200. Dec. 4, 1949. (Not available.)
7. "Waste in Harvesting Cotton with Mechanical Strippers on the High Plains of Texas, 1947." M. N. Williamson, Jr. and Ralph H. Rogers. Texas Station. Progress Report 1111. Feb. 26, 1948. (Not available.)

Some earlier studies of mechanization of the cotton harvest in this area have been published. A few deal with the period when home-made sleds were used, the predecessors of the mechanical strippers.

8. "Requirements and Costs for Picking, Snapping, and Sledding Cotton in Western Texas and Oklahoma." A. P. Brodell and M. Cooper, Bureau of Agricultural Economics. 1927.
9. "Mechanical Harvesting of Cotton in Northwest Texas." D. L. Jones, W. M. Hurst and D. Scoates. Texas Station. Circular 52. 1928. (Not available.)
10. "The Mechanical Harvesting of Cotton." H. P. Smith, D. T. Killough, M. H. Byrom, D. Scoates and D. L. Jones. Texas Station. Bulletin 452. 1932. (Not available.)
11. "Some Technological Changes in the High Plains Cotton Area of Texas." C. A. Bonnen and A. C. Magee, Journal of Farm Economics, Vol. XX. 1938.
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13. "Information Basic to Farm Adjustment in the High Plains Cotton Area of Texas." A. C. Magee, C. A. Bonnen and B. H. Thibodeaux. Texas Station. Bulletin 652. 1944.

14. "Factors Affecting the Performance of Mechanical Cotton Harvesters, Extractors and Cleaners." H. P. Smith, D. T. Killough and D. L. Jones. Texas Station. Bulletin 686. 1946.

Publications of the Texas Employment Commission include a series of in-season reports as to the farm labor supply and demand situation in all major agricultural areas of the state, also an annual review of the farm placement activities of the organization and the major problems encountered in recruiting and directing the labor supply. The figures available from this source are operating data and may be considered as estimates made by expert observers rather than as data obtained either by complete enumeration or by sample surveys. They provide informed estimates in regard to changes in labor demands and labor supplies.

15. "Farm Labor Bulletin." Texas Employment Commission. Published daily from the Cotton Control Center at Lubbock from September 4 through November 19, 1951. Present data on crop conditions, rate of harvest, immigration of workers, orders for workers, placements, needs for additional workers and wage rates.

16. "Texas Farm Placement Service, 1951." Texas Employment Commission. Annual report includes estimates on labor supplies, mechanization, labor shortages and surpluses, the recruitment, direction and placement of seasonal workers.

As a part of the day-to-day information in regard to the 1951 cotton harvest, the daily and weekly news items in the Lubbock daily paper have been valuable sources.

17. "Lubbock Avalanche Journal." Especially the materials on the harvest labor situation as presented by W. J. Robinson of the Farm Placement Service and by K. N. Clapp of Anderson-Clayton Company at Lubbock.

During the period of intensive manpower analysis at the beginning of World War II, both statewide and regional estimates were made on the labor demand and supply situation. Materials dealing with the labor situation in Texas are:

18. "Farm Labor as a Factor in Agricultural Production Goals in Texas, 1942 and 1943." Joe R. Motheral. (Unpublished paper) May 5, 1942.

19. "Labor Requirements to Harvest Texas Cotton, Peanut and Rice Crops, 1942." Joe R. Motheral and A. C. Magee. Texas Station. Progress Report 786. July 1, 1942. (Not available.)

20. "Texas Farm Labor—an Analysis of Demand and On-farm Supply in Four Major Types of Farming Areas, 1943." R. W. Jones, John R. Wenmohs and Joe R. Motheral. (For administrative use only.) Texas Station. 1944.

21. "Use of Labor by Farm Operators of Different Tenure Status in the Texas Black Prairie." Joe R. Motheral. Texas Station. Progress Report 862. Oct. 21, 1943. (Not available.)

22. "Manpower on Texas Ranches," The Cattleman. May 1943.

23. "Farm Labor Situation in Texas." C. Hohn. In papers presented at annual meeting of Texas Agricultural Workers' Association. Jan. 11-12, 1944.

The activities of the Texas Employment Commission in handling labor needs and labor supplies in Texas have developed over a period of years. This development can be traced in several of their publications:

24. "Farm Labor Program in Texas, 1943-1947." Texas Agricultural Extension Service. 1947.

25. "Hired Hands on Order." R M. McKinley. Farm and Ranch 67: 8-9. June 1948.

Studies dealing with mechanization of the cotton harvest in other parts of the United States also indicate the probable changes in labor requirements. Some have also attempted to assess changes in the types of labor required for mechanized cotton operations. These include:

26. "Technology on the Farm." Interbureau Committee and Bureau of Agricultural Economics. 1940.

27. "Experiences in 1945 with Mechanical Cotton Pickers in California." Cruz Venstrom, Bureau of Agricultural Economics. 1946.

28. "Progress of Farm Mechanization." Martin R. Cooper, Glen T. Barton and Albert P. Brodell, Bureau of Agricultural Economics. 1947.

29. "Economics of Mechanical Cotton Harvesting in the San Joaquin Valley, 1949." Warren R. Bailey and Trimble R. Hedges. Calif. Agr. Exp. Sta. Mimeographed Report No. 111. 1951.

30. "Changing Technology and the Demand for Seasonal Workers on Farms." Glen T. Barton. Hearings before Subcommittee on Labor and Labor-Management Relations of the Committee on Labor and Public Welfare. U. S. Senate, 82nd Congress, Second Session on Migratory Labor, Part 2. 1952.

31. "The Labor Supply and Mechanized Cotton Production." Dorothy Dickins. Miss. Agr. Exp. Sta. Bulletin 463. 1949.

32. "Technological Advance and the Structure of American Agriculture." J. C. Ellickson and J. M. Brewster. Journal of Farm Economics. Nov. 1947.

33 "Technology Levels Seasonal Farm Work." Agricultural Situation. June 1947.

34. "Machines in the Cotton Fields: Children in School." L. W. Jones and B. F. MacLanin. School and Society. Oct. 6, 1951.

35. "Impact of Mechanization upon Farm Workers." Employment Security Review. March 1950.

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